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E-mail: [jrfwe2019@gmail.com](mailto:jrfwe2019@gmail.com), [jfewr@yahoo.com](mailto:jfewr@yahoo.com)

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## EPIDERMIOLOGICAL STUDY OF SCHISTOSOMOSIS IN DOGS IN THE SOUTH EASTERN PART OF NIGERIA

<sup>1</sup>Nwoha R. I. O. and <sup>2</sup>Agu, C. V.

<sup>1</sup>Department of Veterinary Medicine, <sup>1</sup>Michael Okpara University of Agriculture Umudike

<sup>2</sup>Department of Veterinary Medicine, <sup>2</sup>Michael Okpara University of Agriculture Umudike

<sup>1</sup>Micheal Okpara University of Agriculture Umudike. P.O. Box 824, Nigeria.

\*Corresponding Author: [rosemarynwoha@yahoo.com](mailto:rosemarynwoha@yahoo.com); +2348030987115.

### ABSTRACT

*Schistosomiasis is considered second only to malaria as one of the most neglected tropical disease. In most settings, cross infection between human and dogs occur which necessitated the need to determine the incidence of schistosomiasis in dogs in the South-eastern Nigeria. To establish a bench mark on schistosomiasis in dogs in the South-eastern Nigeria. In the study 20 out of 36 communities in Ikwuano including all dogs presented at the Veterinary Teaching Hospital, MOUAU all in Ikwuano (L.G.A) were sampled for schistosomiasis. Faecal sample and anal swabs were randomly screened from dogs of various breeds, age bracket and sex. The samples were analysed using faecal flotation technique and direct microscopy. The incidence of the disease was determined and presented in percentage. The incidence of schistosomiasis between breeds, sex and age were compared using independent sample T-test and presented as mean  $\pm$  SE. The level of significance was accepted at ( $p < 0.05$ ). The result recorded an incidence of 1.2% in the South-eastern part of Nigeria. There was an equal incidence of 0.6% recorded in the male as in the female 0.6%. An incidence of 0.9% was recorded in Adults compared to puppies 0.3%. There was no significant difference ( $p < 0.05$ ) in the incidence of schistosomiasis in males  $6.31 \pm 0.21^a$  compared to females  $6.46 \pm 0.20^a$ . There was also no significant difference ( $p < 0.05$ ) in the incidence of schistosomiasis in Adults  $1.45 \pm 0.10^a$  compared to puppies  $1.26 \pm 0.03^a$ . There was however a significant difference ( $p < 0.05$ ) in the incidence of schistosomiasis in Mongrels ( $12.63 \pm 0.32^a$ ) compared to the Exotic ( $11.12 \pm 0.6^b$ ) breeds. Schistosomiasis is among the reportable diseases in the world and therefore, knowledge of the prevalence and intensity of schistosomiasis within areas is crucial in planning of disease intervention strategies.*

**Keywords:** Schistosomiasis, Dogs, Ikwuano, Southeastern, Nigeria, Prevalence

### INTRODUCTION

Schistosomiasis or Bilharzia is a vector-borne disease caused by fluke parasites of the genus: *Schistosoma* (Angaye, 2013). Schistosomiasis is ranked second to malaria as the most prevalent vector-borne disease worldwide (WHO, 2002; 2010). These fluke are among the helminth infection that cause considerable morbidity and mortality in both animals and humans (Lamb *et al.*, 2010). Schistosomiasis or Bilharzia, is one of the most prevalent neglected tropical disease (NTDs) considered a public health problem in many developing countries in the tropics and sub-tropics

(Bruun *et al.*, 2008; WHO, 2010). About 200 million people are infected mostly in developing world with about 700 million people worldwide at risk of infection (Bruun *et al.*, 2008; WHO, 2010). Humans get infected when exposed to contaminated river water harbouring the cercariae shedding snails (Angaye, 2013). Despite decades of control there are still millions of people at risk of contracting schistosomiasis (Van der Werf *et al.*, 2003). The World Health Organization regards the disease as a neglected tropical disease with an estimated 732 million persons being vulnerable to infection worldwide in renowned transmissible areas (WHO,

2014). Over 90% of the infections occurring in sub Saharan Africa (Hotez *et al.*, 2009). However, Nigeria has the greatest number of cases of Schistosomosis worldwide, with about 29 million infected cases and about 101 million people at risk of infection (Steinmann *et al.*, 2006; Hotez *et al.*, 2009; 2012; WHO, 2013).

Despite the high degree of infection in humans and risks of cross infection from humans to animals, there is paucity of information on occurrence of schistosomosis in animals hence the essence of the present study in dogs.

## **MATERIALS AND METHODS**

### **Experimental Design**

Samples were collected from all dogs brought to the Michael Okpara University of Agriculture Umudike Veterinary Teaching Hospital during the 5 months study period from the month of August through to December. During same period samples were also collected from dogs randomly sampled from 20 communities out of a total of 36 communities in Ikwuano Local Government Area of Abia state, Nigeria. Both faecal samples and anal swabs were collected from sampled dogs. Dogs of various breeds, age bracket and sex were sampled in the study.

### **Method of Saline Sedimentation**

Two grams of faecal sample from each dog was put in a test tube and was properly mixed with 0.9g of sodium chloride solution. The tube was then, half filled with the solution and allowed to sediment. The supernatant was decanted, and some drops of the sediment were placed on a glass slide and was covered with cover slip and viewed under X10 and X40 magnification of the microscope (Steeven and Cinthia, 2012).

A few drops of normal saline were placed onto a glass slide and 2g of each of the faecal samples was added to them to make smear. The saline-faecal

### **Study Areas**

Michael Okpara University Veterinary Teaching Hospital is located within the campus in Umudike. Umudike is a semi-urban settlement in Ikwuano Local Government Area (LGA), Abia State, Nigeria. It is about 10 Kilometers Southeast of Umuahia, the State capital. Its headquarters is in Isiala Oboro. It has an area of 281 km<sup>2</sup> and a population of 137,993 by the 2006 census. It is made up of 52 villages and 36 communities and is bounded on the West by Ini LGA of Akwa Ibom State and Umuahia on the North; On the East by Umuahia south and Isiala Ngwa North LGA on the South (Vanguard, 2013; GPS Corordinates, 2014).

extract mixtures were properly mixed and viewed under X10 and X40 magnification of the microscope (Urquhart *et al.*, 1996).

### **Direct Microscopy of Anal Swab**

A drop of normal saline was placed on a glass slide and swab from each dog was streaked onto it. The saline-swab extract mixture was then viewed under X10 and X40 magnification of the microscope (Steeven and Cinthia, 2012).

### **Statistical Analysis**

The data from the study was analyzed using descriptive statistics. The disease incidence was determined and presented in percentage (%) according to the method described by Thrusfield and Christley (2018). The incidence of schistosomiasis between breeds, sex, and age bracket were compared using independent sample T –test and presented as mean  $\pm$  se. The level of significance is accepted at  $p < 0.05$ .

## **RESULTS**

In Table 1, out of a total of 333 dogs sampled within Ikwuano communities and those presented at the Veterinary Teaching Hospital MOUAU only 4 positive cases was isolated giving an incidence of 1.2 %.

**Table 1: Percentage (%) incidence of Schistosomosis in dogs sampled in communities in Ikwuano Local Government Area and Veterinary Teaching Hospital MOUAU**

Total number of positive samples	Total number of samples collected	Percentage incidence (%)
4	333	1.2

From table 2 above, out of 333 dogs sampled from dogs presented at Veterinary Teaching Hospital MOUAU and those from Ikwuano local Government Area of Abia State, 99 were exotic breeds, while 234 were mongrels. Of these 166 were males and 167 females. Also, 267 were adults

and 66 puppies. Only local breeds 4 (1.2%) were *Schistosoma* positive. Of these 4, 2 were males (0.6%) and 2 females (0.6%). Of the 267 adults 3(0.9%) were *Schistosoma* positive while out of 66 puppies only 1(0.3%) was positive of the parasite.

**Table 2: Percentage (%) incidence of Schistosomosis in dogs of various breed, age, and sex sampled in communities in Ikwuano Local Government Area and Veterinary Teaching Hospital MOUAU**

Variables	Sample size	Positive samples	Negative samples	Total sample collected	Percentage incidence (%)
Exotic	99	0	99	333	0.0
Local	234	4	230		1.2
<b>Sex</b>					
	167	2	164	333	0.6
Female					
Male	166	2	165		0.6
<b>Age</b>					
Adult	267	3	264	333	0.9
	66	1	65		0.3
Puppy					

Table 3 above shows the Mean  $\pm$  SE of schistosomiasis between sexes, breeds and age bracket of dogs sampled in communities in Ikwuano Local Government Area and Veterinary Teaching Hospital MOUAU. It show no significant difference ( $p>0.05$ ) in incidence rate of

schistosomiasis in males  $6.31\pm0.21^a$  compared to females  $6.46\pm0.20^a$  as well as in puppies  $1.45\pm0.10^a$  compared to adults  $1.26\pm0.03^a$ . However there was a significant difference ( $p>0.05$ ) recorded in mongrels  $12.63\pm0.32^a$  compared to exotic breeds  $11.12\pm0.60^b$  (as shown in table 2 and 4).

**Table 3: Mean  $\pm$  SE of dogs of various breeds, age and sex sampled in communities in Ikwuano Local Government Area and Veterinary Teaching Hospital MOUAW**

Variables	Variables	Level of significance $p>0.05$
<b>Sex</b>		
Male	Female	No significant difference
6.31±0.21 <sup>a</sup>	6.46±0.20 <sup>a</sup>	
<b>Breed</b>		
Local	Exotic	Significant difference
12.63±0.32 <sup>a</sup>	11.12±0.6 <sup>b</sup>	
<b>Age</b>		
Puppy	Adult	No significant difference
1.45±0.10 <sup>a</sup>	1.26±0.03 <sup>a</sup>	

## DISCUSSION

In this study, *schistosoma* eggs were detected in 1.2% (table 1) of dogs resident in Ikwuano Local Government Area of Abia State, including those that were presented at (VTH) Michael Okpara University of Agriculture, Umudike, which indicates existence of schistosomosis in dogs within the areas of study, though at a very low incidence rate.

This finding indicated the presence of *schistosoma* parasite in dogs and exposes dangers of its potentials as zoonotic threat to public health in the study area. The low incidence 1.2% (table 1) recorded in this study was detected towards the end of rainy season (September to December) and probably would have been higher if the study was conducted during the peak of rainy season (June to July) since disease transmission is affected by contaminated stagnant water and swampy areas often abundant during rainy season and with high numbers of water snails which is the intermediate host of the parasite (Steinmann *et al.*, 2006).

This agreed with the study carried out in humans in Yewa North Local Government Area in Ogun State, Nigeria between February 1<sup>st</sup> to 15<sup>th</sup> recorded high incidence of schistosomosis due to lack of portable water and presence of snail intermediate host in natural water bodies (Ekpo and Mafiana, 2004).

The high incidence rate (table 2, 3) of *schistosoma* eggs in mongrels may be attributed to poor management practices by dog owners who often are people classified as low class citizens with less information on dog keeping. This class of people often reside in most communities and mostly keep dogs for hunting with no form of provisions such as housing, medication or upkeep. These mongrels take solace in scavenging for food at dumping grounds and trek for distance into the bush in search of food. Their sources of water are unknown but certainly include drinking from both stagnated and running streams. Such dogs are at higher risk of exposure to schistosomiasis from stagnant or fresh water bodies than their exotic counterparts which most times are kept by middle class and rich people who makes provision for their upkeep. This finding however confounds with the retrospective study of schistosomiasis in dogs in Texas (Eileen, 2010).

Both male and female mongrels (table 3) are affected by lack of maintenance by their owners and hence the absence of sex difference in the incidence rate of schistosomiasis in the sexes. Also adults are more prone to exposure to various disease conditions including schistosomiasis by virtue of their independent lives which often take them to unsafe areas unlike puppies which often are always at the comfort of their dam and surroundings. This however was not observed in this study and therefore aligns with the report of Eileen (2010).

## CONCLUSION

There is existence of schistosomiasis in dogs within the study area which may serve as a potential source of infection to humans. The apparent paucity of information of schistosomiasis in dogs in Nigeria is a clear indication of under diagnosis of the disease condition in dogs.

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